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Letter of Transmittal

Date	13 June 2006
File Number	32866-000
From	Fernando Pons

To	Alexandria Archaeology 105 North Union Street Alexandria, VA 22314
Attention	Francine W. Bromberg
Copy to	Wendel Duchscherer, Attn: Laird Pylkas Geo-SCI, Attn: Daniel Wagner
Subject	Archeological Report and Boring Location Plan

Copies	Date	Description
4	9 June 2006	Archeological Report DASH Operations and Maintenance Facility Alexandria, Virginia
4	12 June 2006	Boring Location Plan DASH Operations and Maintenance Facility Alexandria, Virginia

Transmitted via ☒ First class mail ☐ Overnight express ☐ Hand delivery ☐ Other

Remarks

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GEOMORPHOLOGICAL ASSESSMENT

OF DASH BUS FACILITY

IN ALEXANDRIA, VIRGINIA

By
Daniel P. Wagner, Ph.D.
Pedologist

Submitted to
Haley & Aldrich

June 9, 2006

Introduction and Methods

This report summarizes pedological and geoarchaeological investigations at the Dash Bus Facility in Alexandria, Virginia. The principal objective of the study was to ascertain whether any original, formerly inhabitable land surfaces still persist within the artificially sculpted topography of the site. Since it is known that previous landscape modifications at least in part entailed a considerable amount of filling, the possibility exists that original surfaces might be preserved beneath the fill at some locations. This in turn offers the prospect that buried cultural resources might also be present. Investigations were therefore directed toward examinations of soil features for indications of deposit types and intact natural land surfaces that may once have been available to former inhabitants of the area.

Field investigations were made on May 8, 9 and 10, 2006. These consisted of soil examinations by means of GeoProbe coring. A total of 21 borings were sampled at locations chiefly confined to areas that will be deeply disturbed in construction of the facility. Tubes containing continuous soil and sediment columns were collected to varying depths ranging from a minimum of 8 ft to as much as 20 ft. Most borings were typically terminated at the depth of 16 ft, a depth normally extending well below the surficial fill mantle. Examined soil materials were described in accordance with standard pedological techniques and nomenclature for the field characterization of soil, and the compiled descriptions are contained in Appendix A.

Geomorphic Setting

As with most of northeastern Fairfax County and all of the City of Alexandria, the study location is situated within the Coastal Plain Physiographic Province. Geologically, this province is characterized by unconsolidated sediments that can range widely both in composition as well as age. Sediments as old as Lower Cretaceous are predominant throughout the broader region, and form most of the upland terrain north of the project area. These ancient sediments are often capped by younger deposits of Quaternary age, particularly at elevations lower than about 100 ft or so. Quaternary sediments were mainly derived by fluvial processes and usually have mixed compositions characterized by sandy and gravelly strata interbedded with layers of loamy, silty or even clayey sediments.

Quaternary Coastal Plain sediments are commonly arranged in a topographic stepping of multiple terrace levels, particularly within valleys of the major coastal rivers and their tributaries. Resulting from a combination of tectonic uplift and fluctuating sea levels related to Pleistocene glacial cycles, a series of Pleistocene terraces occurs throughout the mid-Atlantic region. These terraces are typically assigned names based on elevation and age, and the roughly 50-ft elevation of the project area places it on either the Talbot or Sunderland Terrace, both of which have ages ranging well into the

Pleistocene. Hence, even though soil age and landform age are seldom the same, the original soils of the site are nevertheless likely to have had a very prolonged history of weathering greatly predating even the earliest human presence in the region. This has important implications for both prehistoric and early historic cultural resources since, as would be the case for all landscapes of such antiquity, any cultural materials should occur only at or near the level of the original surface. The only other potential opportunities for cultural materials with definable contexts would be where fill sequences contain artificial surfaces that were temporarily available to later historic inhabitants.

Results

Consistent with previous investigations and the overt topographic indications of disturbance, mixed fill materials were identified as a surface mantle at all test locations. These materials were mainly earthen in composition and varied in thickness from 2 ft to as much as 10 ft. In some instances the fill was so free of debris or artificial mixing of obviously different materials that distinctions between it and underlying stratified Coastal Plain sediments were not sufficiently clear for definitive determinations of fill depths. In most cases, however, this was not a problem, and the relatively high density of observations allowed for the identification of trends in both fill thickness and severity of soil disturbance.

Over the great majority of the site encompassing all but about the easternmost quarter, disturbances to natural soils are extreme, and neither the original land surface nor even underlying upper subsoil horizons still exist. In this situation surficial fill materials rest directly atop unweathered Coastal Plain substrata, and the absence of the upper soil profile is evidence that most of the site was deeply graded prior to introduction of the surface fill. Given the antiquity of the former landscape which would have allowed for advanced soil development and solum formation likely on the order of 6 ft or more in thickness, grading to at least this depth is therefore indicated. Indeed, along the northern edge of the project area excavations of the original soil could well have been considerably greater. This is suggested by the current topography which, as depicted on the USGS 7.5’ quadrangle, shows the site as a level platform carved from the sloping toe of the rising Coastal Plain upland. Similarly, a Civil War era topographic map provided by Alexandria Archaeology shows two contour lines (20-ft interval) over the originally more sloping western part of the project area. Hence, the map data are in close accord with the observations of this study, which demonstrate significant landscape truncation and attending destruction of any cultural resources for most of the area.

Although total destruction of original soils is generally not the case for the eastern section of the project area, significant disturbances typically entailing about 2 ft of so of truncation have also affected this part of the site. Of the seven borings made on the eastern side of the site, five (GP5, GP13, GP18, GP19, GP20) intercepted intact subsoil (B) horizons. In all but one (GP18) of these, however, only lower subsoil horizons still remained; and any upper levels that might potentially have contained cultural materials

no longer exist. Even in Boring GP18 where a remnant of the surface horizon (Ap) was possibly identified below nearly 4 ft of fill, the darkish (10YR 4/3) surface layer exhibited evidence of considerable mixing with browner (7.5YR 5/6) subsoil material, indicating a relatively severe amount of disturbance at a minimum. As previously addressed, the integrity of surface horizons on old upland landscapes is paramount to cultural resource interpretations, and given the degree of observed disturbance, the soil can not be considered wholly intact. Therefore, and in light of the even greater amounts of disturbance at nearby locations, any cultural materials present would be of dubious context.

Observations in the eastern part of the project area are also consistent with interpretations of the Civil War era map and varying impacts of previous grading across the site. Apparently, the elevation of the desired grade was near or just below original surface elevations in the east. Thus, whereas the higher positions to the west were very deeply truncated, the lower eastern landscape was carved out only a few feet or less. Also of note on the early map is the presence of a small stream that formerly arced across the northeast corner of the project area. This is not only compatible with the lower elevations in the east, but in borings located relatively close to the former stream (GP5, GP13), observed subsoil gleying and mottling are consistent with more poorly drained conditions that might be expected for a lower landscape position.

Summary

The Dash Bus Facility occupies a Coastal Plain upland that has been extensively graded and filled. Situated on an ancient Pleistocene terrace, the investigated area originally supported very old soils in which any cultural materials would have been at or near the original natural surface. At only a single location (GP18) was a possible remnant of this surface identified beneath a fill mantle that covers the entire site, and even here the possible surface appears to have suffered severe disturbance. Elsewhere, not only does the original surface no longer exist, but in most cases the complete absence of weathered subsoil horizons indicates that the site was deeply graded prior to emplacement of the fill. A Civil War era topographic map shows that the original site landscape originally declined to the south and east, which is a contour pattern consistent with observed deeper grading in the west that would have been necessary to achieve a desired level plane. Even though the eastern side of the project area was subject to less deep grading, the degree of observed soil truncation and disturbance is more than sufficient to negate any prospects for intact cultural resources.

APPENDIX A

Descriptions for Core Borings

Depth (ft)	Soil Horizon (If Present)	Properties
Boring GP1		
0 - 4.0		Mixed earthen fill
4.0 - 11.8		Brown (7.5YR 4/4), light olive brown (2.5Y 5/3), and dark yellowish brown (10YR 4/4) fine sandy loam
11.8 - 16.0		Grayish brown (2.5Y 5/2) and light olive brown (2.5Y 5/3, 5/4) sandy clay loam
Notes: Graded and filled Coastal Plain upland; original surface and subsoil destroyed		
Boring GP2		
0 - 3.5		Mixed earthen fill
3.5 - 4.0		Dark grayish brown (2.5Y 4/2) loam; artificial surface
4.0 - 4.8		Yellowish (5YR 4/6) sandy clay loam and gravelly loamy sand; common, medium distinct mottles of brown (10YR 5/3)
4.8 - 5.3		Strong brown (7.5YR 5/8) clay; many; large prominent mottles of gray (5Y 6/1)
5.3 - 7.5		Yellowish red (5YR 4/6) and red (2.5YR 4/6) clay; many; large prominent mottles of gray (5Y 6/1)
7.5 - 14.8		Light gray (2.5Y 7/1) clay loam; common, medium prominent mottles of strong brown (7.5YR 4/6)
14.8 - 16.0		Yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) gravelly sandy clay loam
Notes: Graded and filled Coastal Plain upland; original surface and subsoil destroyed		

Boring GP3

0 - 1.5	Mixed earthen fill
1.5 - 2.2	Yellowish red (5YR 4/6) clay; common, medium prominent mottles of gray (5Y 6/1)
2.2 - 8.0	Yellowish red (5YR 4/6), gray (5Y 6/1), and yellowish brown (10YR 5/6) stratified clay and gravelly clay loam

Notes: Graded and filled Coastal Plain upland; original surface and subsoil destroyed; no retrieval below 8 ft; entire 8 ft could be fill

Boring GP4

0 - 8.2	Mixed earthen fill
8.2 - 12.0	Strong brown (7.5YR 4/6) clay loam; many, medium prominent mottles of light brownish gray (2.5Y 6/2)
12.0 - 14.5	Yellowish brown (10YR 5/6) sandy clay loam with pebbles; common, medium prominent mottles of light brownish gray (10YR 6/2)
14.5 - 17.0	Greenish gray (10Y 6/1) sandy clay loam; many, medium distinct mottles of light olive brown (2.5Y 5/4)
17.0 - 20.0	Yellowish brown (10YR 5/4) and yellowish red (5YR 4/6) clay; many, large prominent mottles of gray (5Y 6/1)

Notes: Graded and filled Coastal Plain upland; original surface and subsoil destroyed; deposits below 17 ft may be Cretaceous

Boring GP5

0 - 2.0		Mixed earthen fill
2.0 - 3.5	Bt	Strong brown (7.5YR 4/6) clay loam; many, medium prominent mottles of light brownish gray (10YR 6/2)
3.5 - 4.5	Btg	Gray (5Y 6/1) clay loam; many, large prominent mottles of strong brown (7.5YR 5/6)
4.5 - 6.0	BC	Yellowish red (5YR 5/8) heavy sandy loam; many, large prominent mottles of gray (5Y 6/1)

6.0 - 10.0	C	Gray (5Y 6/1), yellowish red (5YR 4/6), and yellowish brown (10YR 5/6) sandy clay loam, clay and clay loam
10.0 - 11.8	2C	Yellowish brown (10YR 5/6) loam and sandy loam; many, medium distinct mottles of light brownish gray (2.5Y 6/2)
11.8 - 16.0	3Cg	Dark gray (2.5Y 4/1) fine sandy loam; few organic fibers

Notes: Graded and filled Coastal Plain upland; original soil estimated to be truncated about 2 to 3 ft

Boring GP6

0 - 6.5	Mixed earthen fill
6.5 - 15.0	Yellowish red (5YR 4/6) clay; many, medium prominent mottles of gray (5Y 6/1)
15.0 - 16.0	Brown (10YR 4/3) silty clay; many, medium prominent mottles of gray (5Y 6/1)

Notes: Graded and filled Coastal Plain upland; original surface and subsoil destroyed; poor below 12 ft

Boring GP7

0 - 6.5	Mixed earthen fill
6.5 - 11.2	Yellowish red (5YR 4/6) clay; many, medium prominent mottles of gray (5Y 6/1)
11.2 - 16.0	Light olive gray (5Y 6/2) clay; many, large prominent mottles of yellowish red (5YR 4/6)

Notes: Graded and filled Coastal Plain upland; original surface and subsoil destroyed; gravel at base

Boring GP7

0 - 6.5	Mixed earthen fill
6.5 - 11.2	Yellowish red (5YR 4/6) clay; many, medium prominent mottles of gray (5Y 6/1)
11.2 - 16.0	Light olive gray (5Y 6/2) clay; many, large prominent mottles of strong brown (7.5YR 5/8); gravel at base

Notes: Graded and filled Coastal Plain upland; original surface and subsoil destroyed

Boring GP8

0 - 3.5	Mixed earthen fill
3.5 - 8.0	Yellowish red (5YR 4/6) clay; many, large prominent mottles of gray (5Y 6/1)
8.0 - 12.5	Gray (5Y 6/1) clay; many, medium prominent mottles of strong brown (7.5YR 4/6)

Notes: Graded and filled Coastal Plain upland; original surface and subsoil destroyed; no retrieval below 12.5 ft

Boring GP9

0 - 2.5	Mixed earthen fill
2.5 - 6.0	Yellowish Red (5YR 4/6) and gray (5Y 6/1) clay
6.0 - 8.9	Strong brown (7.5YR 4/6), dark yellowish brown (10YR 4/4), and gray (5Y 6/1) gravelly clay loam
8.9 - 14.5	Strong brown (7.5YR 4/6) and gray (5Y 6/1) clay loam;
14.5 - 16.0	Strong brown (7.5YR 4/6) and olive gray (5Y 4/2) gravelly sandy loam and gravelly loamy sand

Notes: Graded and filled Coastal Plain upland; original surface and subsoil destroyed; fill possibly extends to 8.4 ft

Boring GP10

0 - 2.6	Mixed earthen fill
2.6 - 3.8	Dark yellowish brown (10YR 4/6) clay loam; common, medium distinct mottles of olive gray (5Y 5/2); upper part is dark gray (5Y 4/1) loam with coal, artificial surface
3.8 - 7.2	Strong brown (7.5YR 4/6) clay; many, medium prominent mottles of gray (5Y 6/1)

7.2 - 16.0		Strong brown (7.5YR 4/6), gray (5Y 6/1), olive brown (2.5Y 4/4), and strong brown (7.5YR 5/6) stratified gravelly sandy loam, sandy loam, and clay loam

Notes: Graded and filled Coastal Plain upland; original surface and subsoil destroyed

Boring GP11

0 - 7.6		Mixed earthen fill
7.6 - 13.6		Strong brown (7.5YR 4/6) and dark yellowish brown (10YR 4/4) sandy clay loam, gravelly sandy loam, and clay loam; common, large prominent mottles of olive gray (5Y 5/2)
13.6 - 16.0		Strong brown (7.5YR 5/8) clay; many, medium prominent mottles of gray (5Y 6/1)

Notes: Graded and filled Coastal Plain upland; original surface and subsoil destroyed

Boring GP12

0 - 10.0		Mixed earthen fill with high gravel content
10.0 - 11.8		Strong brown (7.5YR 4/6) clay loam with sandy loam lenses; many, medium prominent mottles of gray (5Y 6/1)
11.8 - 14.0		Greenish gray (10Y 6/1) silty clay
14.0 - 16.0		Gray (5Y 5/1) clay loam

Notes: Graded and filled Coastal Plain upland; original surface and subsoil destroyed

Boring GP13

0 - 5.0		Mixed earthen fill
5.0 - 6.2	Bt1	Strong brown (7.5YR 5/8) clay loam; common, medium prominent mottles of light brownish gray (10YR 6/2)
6.2 - 7.5	Bt2	Strong brown (7.5YR 5/6) clay loam; many, medium prominent mottles of light brownish gray (2.5Y 6/2)
7.5 - 8.5	BCg	Light brownish gray (2.5Y 6/2) sandy clay loam; common, medium prominent mottles of strong brown (7.5YR 4/6)
8.5 - 15.0	Cg1	Gray (5Y 6/1), strong brown (7.5YR 5/6), and yellowish brown (10YR 5/6) clay, sandy clay loam, and silty clay

15.0 - 16.0	Cg2	Greenish gray (5GY 5/1) sandy clay loam with a few pebbles

Notes: Graded and filled Coastal Plain upland; original soil estimated to be truncated about 2 ft

Boring GP14

0 - 5.0	Mixed earthen fill
5.0 - 7.5	Light gray (2.5Y 7/2) sandy clay loam; many, medium prominent mottles of strong brown (7.5YR 4/6)
7.5 - 10.0	Light gray (2.5Y 7/1) sandy loam; common, medium prominent mottles of yellowish brown (10YR 5/6)
10.0 - 16.0	Light gray (2.5Y 7/1), strong brown (7.5YR 4/6), and yellowish brown (10YR 5/6) sandy clay loam, clay loam, and silty clay loam

Notes: Graded and filled Coastal Plain upland; original surface and most of not all subsoil destroyed; original soil estimated to be truncated about 4 to 5 ft

Boring GP15

0 - 6.2	Mixed earthen fill
6.2 - 9.2	Yellowish red (5YR 4/6) clay; many, medium prominent mottles of gray (5Y 6/1)
9.2 - 12.0	Gray (5Y 6/1) clay; many, medium prominent mottles of yellowish red (5YR 4/6)
12.0 - 15.0	Light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) very gravelly sandy clay loam
15.0 - 16.0	Strong brown (7.5YR 4/6) gravelly sandy clay loam

Notes: Graded and filled Coastal Plain upland; original surface and subsoil destroyed

Boring GP16

0 - 3.8	Mixed earthen fill
3.8 - 4.3	Olive brown (2.5Y 4/4) clay loam
4.3 - 5.5	Olive gray (5Y 5/2) clay; common, medium distinct mottles of olive brown (2.5Y 4/4)
5.5 - 13.5	Yellowish Red (5YR 4/6), gray (5Y 6/1), and strong brown (7.5YR 4/6) clay and gravelly clay loam
13.5 - 16.0	Strong brown (7.5YR 5/8), yellowish red (5YR 5/8), and yellowish brown (10YR 5/6) sandy loam, gravelly sandy loam, and sandy clay loam

Notes: Graded and filled Coastal Plain upland; original surface and subsoil destroyed

Boring GP17

0 - 2.8	Mixed earthen fill
2.8 - 5.0	Strong brown (7.5YR 4/6) clay loam with pebbles
5.0 - 9.5	Yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) very gravelly sandy loam
9.5 - 16.0	Strong brown (7.5YR 4/6 and 5/8) clay stratified with yellowish brown (10YR 5/6) gravelly sandy loam

Notes: Graded and filled Coastal Plain upland; original surface and subsoil destroyed; fill may extend to 9.5 ft

Boring GP18

0 - 3.9		Mixed earthen fill
3.9 - 4.8	Ap	Brown (10YR 4/3) mixed with strong brown (7.5YR 5/6 sandy loam; possible disturbed surface
4.8 - 5.2	BE	Strong brown (7.5YR 5/6) heavy sandy loam
5.2 - 7.0	Bt1	Strong brown (7.5YR 5/6) clay loam; common, medium distinct mottles of light brownish gray (10YR 6/2) and yellowish red (5YR 4/6)

7.0 - 8.5	Bt2	Red (2.5YR 4/6) clay; common, medium prominent mottles of gray (5Y 6/1)
8.5 - 10.0	BC	Strong brown (7.5YR 5/6) sandy clay loam; many, medium distinct mottles of gray (5Y 6/1)
10.0 - 12.0	C	Yellowish Red (5YR 4/6), gray (5Y 6/1), and yellowish brown (10YR 5/6) stratified clay, sandy clay loam, and clay loam
12.0 - 14.0 prominent	Cg	Gray (5Y 6/1) silty clay and clay; many, medium mottles of strong brown (7.5YR 4/6)
14.0 - 18.5	C’	Strong brown (7.5YR 5/8) and gray (5Y 6/1) clay

Notes: Filled Coastal Plain upland; original surface possibly present, but disturbed and mixed

Boring GP19

0 - 2.0		Mixed earthen fill
2.0 - 3.0	Bt1	Strong brown (7.5YR 4/6) heavy loam
3.0 - 4.8	Bt2	Strong brown (7.5YR 4/6) clay loam; common, medium distinct mottles of brown (10YR 5/3)
4.8 - 6.4	BC	Yellowish red (5YR 4/6) sandy clay loam
6.4 - 15.0	C	Strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) gravelly sandy loam and sandy clay loam
15.0 - 16.0	Cg	Dark gray (5Y 4/1) clay loam with pebbles

Notes: Graded and filled Coastal Plain upland; original soil estimated to be truncated about 1 to 2 ft

Boring GP20

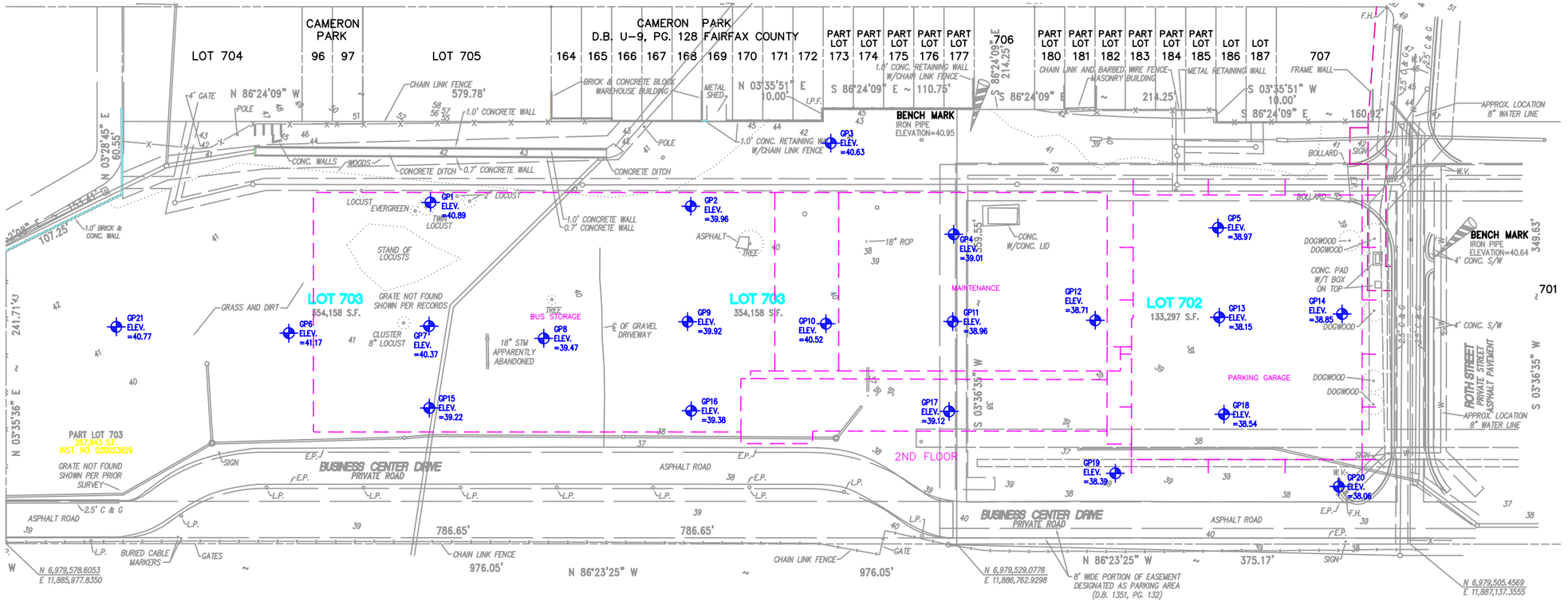
0 - 3.8		Mixed earthen fill
3.8 - 4.2 brown		Dark grayish brown (2.5Y 4/2) and very dark grayish (2.5Y 3/3) mixed with dark yellowish brown (10YR 4/6) heavy loam; possible disturbed surface
4.2 - 6.5	Bt	Strong brown (7.5YR 5/8) clay; common, medium distinct mottles of brown (10YR 5/3); gravel lenses
6.5 - 7.6	BC	Strong brown (7.5YR 5/6) sandy clay loam; many medium distinct mottles of light brownish gray (10YR 6/2)
7.6 - 9.0	C	Light gray (5Y 7/2), yellowish brown (10YR 5/6), yellowish red (5YR 4/6) stratified clay loam, clay and sandy clay loam
9.0 - 10.0	2C	Strong brown (7.5YR 5/6) gravelly sandy clay loam
10.0 - 14.0	3C	Yellowish Red (5YR 4/6) stratified clay, clay loam, and sandy clay loam; common medium prominent mottles of light brownish gray (10YR 6/2)

Notes: Graded and filled Coastal Plain upland; if present, original surface is severely disturbed

Boring GP21

0 - 4.0	Mixed earthen fill
4.0 - 12.0	Red (2.5YR 4/6) and gray (5Y 6/1) clay
8.0 - 12.5	Gray (5Y 6/1) clay; many, medium prominent mottles of strong brown (7.5YR 4/6)

Notes: Graded and filled Coastal Plain upland; original surface and subsoil destroyed



LEGEND:

H & A GEOPROBE LOCATION (GP1-GP21)

APPROXIMATE PROPOSED BUILDING AREAS

NOTES:

1. BORING LOCATION PLAN BASED ON "TEST BORING LOCATIONS, LOT 702 AND LOT 703 OF THE CONSOLIDATION AND RESUBDIVISION OF LOT 600", PREPARED BY ALEXANDRIA SURVEYS INTERNATIONAL, LLC, DATED 25 APRIL 2006.

2. BORING SURVEYED AT AS-DRILLED LOCATIONS BY ALEXANDRIA SURVEYS INTERNATIONAL, LLC, ON 1 JUNE 2006.

3. GEOPROBE EXPLORATIONS WERE ADVANCED BY ICOR, LTD, OF WOODBRIDGE, VA, ON 8 MAY 2006 THROUGHT 9 MAY 2006

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S

0 50 100 150 200
SCALE IN FEET

HALEY & ALDRICH

DASH BUS FACILITY
ALEXANDRIA, VIRGINIA

BORING LOCATION PLAN

SCALE: SCALE AS SHOWN
12 JUNE 2006

FIGURE 1

G:\PROJECTS\32866 DASH\001 - ADDITIONAL SERVICES\01 - ARCHEOLOGY\32866-002-00D2-BRNGPLAN-SURV.DWG